

*AN EVALUATION OF THE EFFECTIVENESS OF  
EXPOSURE AND RESPONSE PREVENTION ON  
REPETITIVE BEHAVIORS ASSOCIATED WITH  
TOURETTE'S SYNDROME*

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Exposure and response prevention (ERP) was evaluated as treatment for three repetitive behaviors in an 11-year-old boy using a multiple baseline across behaviors design. The repetitive behaviors and associated self-reported distress were eliminated. At 3-month follow-up, the frequency for two of the three behaviors returned to baseline levels. This study demonstrates that ERP may be a useful treatment for repetitive behaviors, although booster sessions may be needed to maintain the treatment effects.

**DESCRIPTORS:** Tourette's syndrome, tics, behavior therapy, exposure and response prevention

Tourette's syndrome involves motor and vocal tics that occur for at least 12 months (American Psychiatric Association, 2000). Obsessive compulsive features, often characterized as complex tics, have been found in up to 80% of individuals with the disorder (Leckman, King, & Cohen, 1999). Private antecedents to such behaviors often include aversive sensory phenomena and urges or feelings of tension that dissipate after engaging in the behavior. One method that has been used to reduce such repetitive behavior in other clinical populations (obsessive compulsive disorder) is exposure and response prevention (ERP). ERP consists of repeated, prolonged exposures to stimuli that elicit discomfort and instructions to refrain from any behavior that serves to reduce discomfort. However, only one uncontrolled case study has examined the specific treatment of repetitive behaviors using ERP (Woods, Hook, Spellman, & Friman, 2000) in a patient with Tourette's syndrome. The present study displays the first controlled evaluation of the treatment of complex tics using ERP.

## METHOD

### *Participant*

Brett was an 11-year-old Caucasian boy of normal intelligence who had been exhibiting symptoms of Tourette's syndrome since the age of 8. According to a structured clinical interview (Schaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000), Brett met the diagnosis for Tourette's syndrome only, and obsessive compulsive disorder was ruled out. Throughout the study, Brett was taking Luvox.

Three of Brett's repetitive behaviors with identifiable antecedents were investigated for treatment: evening up, arranging, and symmetry. The antecedents were reported to be varying levels of physical anxiety in which he felt warm throughout his body. *Evening up* was defined as moving similar objects to match (e.g., the orientation, function, or location) others around them. *Arranging* was defined as placing a group of mixed objects (e.g., silverware) into separate matching groups. *Symmetry* was defined as moving similar classes of objects (e.g., books, models, etc.) in a manner so that the objects were arranged in ascending or descending order according to a physical dimension such as width or height. Brett reported that none of these behaviors were performed in response to an obsession or with the intent to prevent or

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discontinue a feared event (as seen in individuals with obsessive compulsive disorder). A hierarchy of situations that were most likely to elicit each behavior was constructed. For example, situations that evoked evening up included seeing items that hang off the edge of a shelf or hang over the edge of table (e.g., paper or a television remote control) or being presented with a stack of papers in which the edges of some papers stick out at various lengths.

### *Procedure*

*Behavioral exposure tests.* Behavioral exposure tests for the three behaviors were composed of the situation in each hierarchy most likely to elicit the behavior. Each test was separately administered for 5 min, two to three times per week in Brett's home. Before treatment began, the tests were recorded by a videocamera within Brett's view and were administered by an independent evaluator. Each minute, the participant was asked for his rating on a subjective units of discomfort scale (0 to 10, with the higher score indicating greater distress), and the frequency of the completion of a target behavior (i.e., placing all objects into matching groups) was noted. After a target behavior was performed, the situation was immediately recreated by the evaluator, and the test continued until the 5-min assessment was completed. Treatment began for the first behavior that did not demonstrate a downward trend based on self-reported discomfort ratings. Behavioral exposure tests were then administered once or twice per week after treatment was initiated and at a 3-month follow up. All tests took place in Brett's home.

*Treatment.* Treatment involved ERP in a clinic setting, approximately two to three times per week. Up to four of the situations most likely to elicit the target behavior were presented to Brett, who was given instructions to resist performing the behavior in that situation. Brett was given verbal reminders to resist the behavior if he made attempts to contact the objects in the eliciting situation.

Although Brett did not require more than verbal reminders to resist the behavior, the therapist could have used physical prompts (i.e., gently guiding Brett's hands away from the stimulus in question) to direct him away from the target behavior. Each situation was administered for a maximum of 20 min per session and was considered completed after Brett's discomfort rating was 2 or less for 5 consecutive minutes starting within the first 3 min of the exposure exercise for two straight sessions. At the end of each session, Brett was instructed to practice ERP for 15 to 20 min per day at home and to refrain from participating in the behavior currently being treated. After all situations relevant to a specific target behavior had been treated, the next behavior that did not display a downward trend began treatment. One treatment session occurred before the fourth test, and two sessions occurred before the fifth test to treat symmetry. After treatment for symmetry had been completed, two sessions occurred before the sixth test, and finally a single session before the seventh test was conducted to treat evening up. However, because arranging behaviors and associated discomfort scores decreased to zero at this point, no sessions were conducted to specifically target arranging. A multiple baseline across behaviors was used to evaluate the intervention.

*Interobserver agreement.* The frequency of the repetitive behaviors during behavioral exposure tests were coded by the first author. Interobserver agreement was calculated by having an independent observer score 25% of the tests and dividing the smaller frequency total by the higher frequency total. Agreement was 100% for evening up, 100% for arranging, and 92% for symmetry (range, 83% to 100%). Agreement was calculated for the verbal discomfort reports by having an independent observer listen to 25% of the videotaped recordings of tests and dividing the total number of agreements on a discomfort response by the total number of responses. Agreement was 100%.

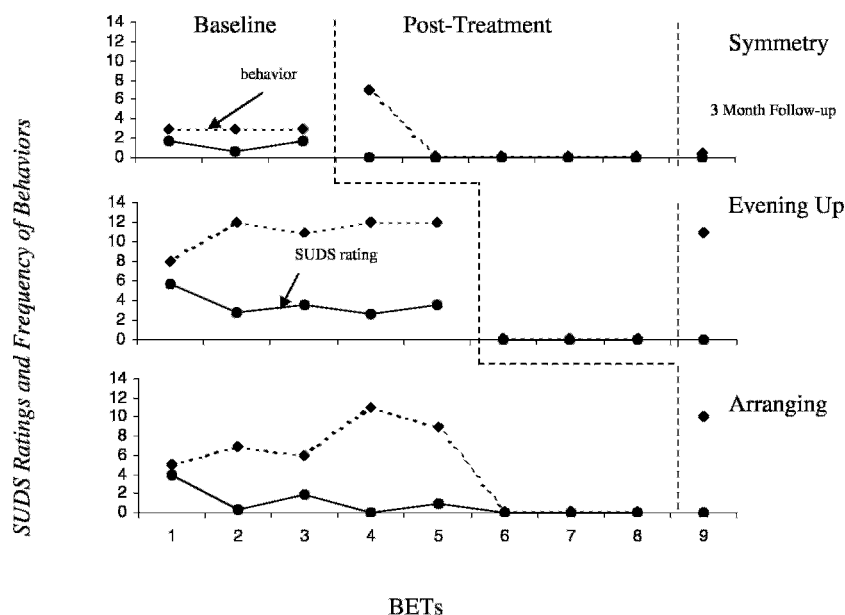


Figure 1. Discomfort ratings and frequency of behaviors during home behavioral exposure tests.

## RESULTS AND DISCUSSION

The results are presented in Figure 1. Brett displayed a mean of three symmetry behaviors during baseline behavioral exposure tests; these behaviors decreased to zero after three treatment sessions. The session average discomfort ratings for the symmetry condition went from a baseline mean of 1.33 to zero after three treatment sessions. Brett displayed a mean of 11 evening-up behaviors during baseline tests; this number dropped to zero after two treatment sessions. The session average discomfort ratings went from a mean of 3.65 for the baseline period of evening up to zero after two treatment sessions. Brett displayed a mean of 6.3 arranging behaviors across the first five tests; this number decreased to zero after two treatment sessions. The session average discomfort ratings went from a mean of 1.44 during the first five tests to zero after two treatment sessions. At the 3-month follow-up, Brett's discomfort rating remained at zero, although his evening-up and arranging behaviors returned to baseline levels.

The treatment successfully reduced Brett's discomfort ratings and actual behavior for all

the repetitive behaviors in question. Although we cannot rule out the possibility of an extraneous variable accounting for the remission of the self-reported antecedent distress and behaviors in the arranging condition, we believe the most parsimonious accounts for this effect to be either the generalization of the treatment or perhaps that arranging and evening-up behaviors were part of the same functional class.

In summary, this study was conducted as an initial controlled exploration into the efficacy of ERP for treating repetitive behaviors in an individual with Tourette's syndrome. The study extends the effectiveness of ERP on complex tics that resemble those of obsessive compulsive disorder. Despite the success of the study, several limitations should be noted. First, the effects of treatment were not maintained at a 3-month follow-up. Future studies should evaluate booster sessions to maintain the treatment effects, as suggested by Riggs and Foa (1993). Second, although Brett and his father reported that Brett was no longer performing these behaviors outside the tests, there was no direct observation to confirm these statements. Finally, Brett reported low levels of discomfort while performing the

task, which may indicate a low level of severity in the presentation of his disorder.

Despite these limitations, the study suggests some promise for ERP in treating repetitive behaviors of Tourette's syndrome and also suggests other areas for future research. A number of variables could be addressed to determine the generalizability of the treatment to other areas, such as the severity of Tourette's syndrome, the amount of impairment caused by the repetitive behaviors, and the ability to identify an antecedent to elicit the repetitive behavior. Finally, the generalizability of this procedure in more severe cases of repetitive behaviors associated with Tourette's syndrome may be pursued.

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